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The Analyst

RS422/RS232 Tester

(Standard Model)

User Manual

Manual Revision 102506

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A. Revision History

10/14/04 Updated Adapter section description for RS232 operation. Updated Monitor section with new functionality for RS232 operation. Updated Specification sections with new line drawing.

05/07/05 Port selection, baud rate, and parity selections now saved in non-volatile memory. Updated and cleaned up user manual.

10/02/06 Added reference section.

10/09/06 Updated Block Diagrams.

10/25/06 Correct Reference Monitor Diagrams.

B. Introduction

Congratulations on purchasing The Analyst RS422/RS232 Tester.

Because Troubleshooting RS422 & RS232 Interfaces can be so Time Consuming and Frustrating

Anyone working with RS232 and RS422 cabling and equipment understands how difficult and time consuming it can be to track down the problem that is keeping a system from working. The Analyst is an easy-to-use, intuitive troubleshooting tool that enables experts and non-experts alike to rule out potential problems quickly and fix the real problem rather than expending resources on time-consuming trial-and-error methods.

Quickly and easily isolate and identify RS422 and RS232 interface problems — whether testing cable runs between floors or between buildings, verifying RS422/RS232 signal paths, chasing down an RS422 to RS232 adapter problem, or troubleshooting communication problems between equipment.

When to Consult the Analyst:

-Remote production setup: mobile production units, special events
-New studio builds, facility upgrades: new equipment, new cabling
-Maintaining existing facilities and systems

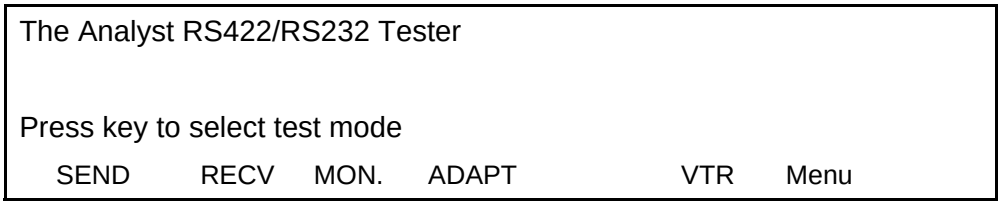
We would like to hear from you. Please let us know how you are using The Analyst and how we can improve it. Our email address is The-Analyst@dnfcontrols.com.

C. Getting Started . . .

C1. Turn On The Analyst

1) Plug one end of the power supply into the “Power Input” connect on the right side of the Analyst, next to the power switch.
2) Plug the other end of the power supply into a wall outlet.
3) Turn the power switch ON.
4) The MAIN screen will be displayed.

MAIN Screen

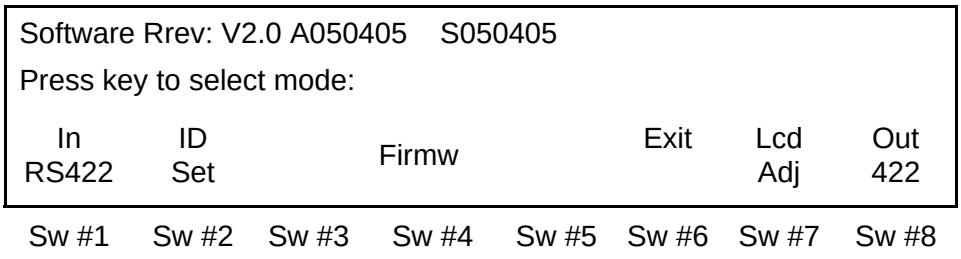


Prior to using the Analyst, enter a unique 5-character ID using the “ID Set” function from the Menu Mode. The Analyst’s ID is helpful when testing cables and signal paths to confirm that both ends of the cable or signal path you are testing are indeed connected together.

C2. Enter Analyst ID

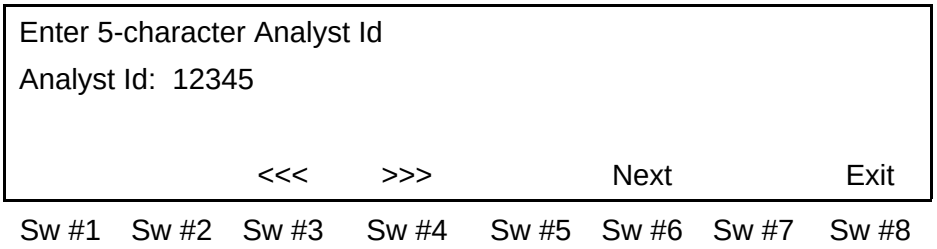
a) From the MAIN screen, press the [Menu] key. The MENU screen will be displayed.

MENU Screen



b) Press the [ID Set] key. The ID entry screen will be displayed.

ID ENTRY Screen



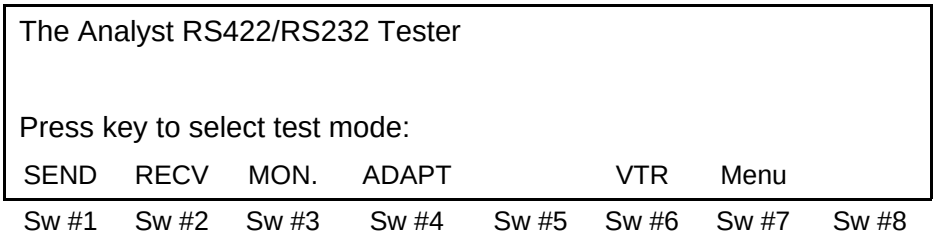
c) The current Analyst ID will be displayed on the 2nd line.
Select a character position using the [<<<] and [>>>] keys.
Use the knob to change the character at the selected position.

d) Press the [NEXT] key to save the new ID and exit to the MENU screen
OR,
Press the [Exit] key to exit without saving the new ID.

The Analyst is ready for use.

D. Analyst Test Modes

MAIN Screen



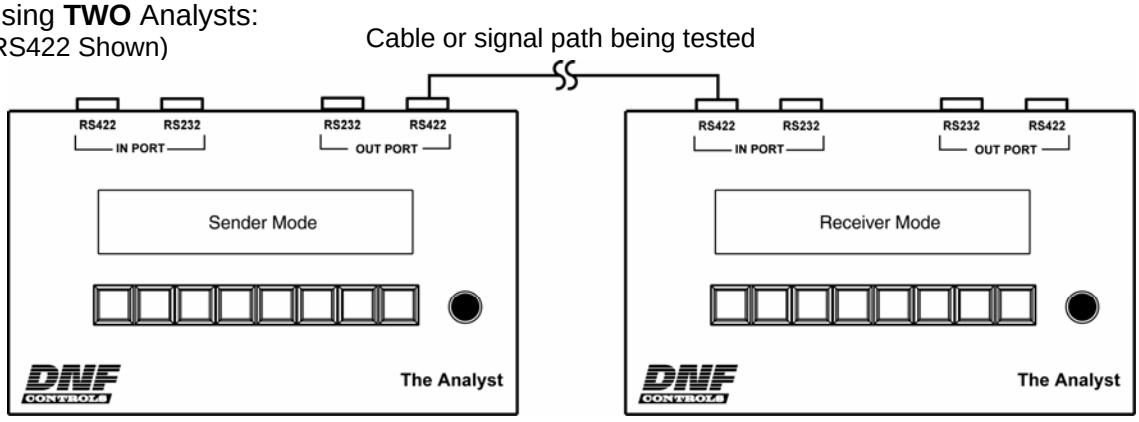
MAIN Screen TEST MODES-	Description
SEND	Sender Mode is used for testing cables and signal paths.
RECV	Receiver Mode is used in conjunction with SENDER mode for testing cables and signal paths.
MON	Monitor Mode is used for testing serial communication problems between two pieces of equipment.
ADAPT	Adapter Mode is used for testing RS232 To RS422 Adapters
VTR	VTR Mode is used for testing cables and signal paths with a VTR.
MENU	Menu Mode is used for setting up and configuring the Analyst.

E. Cable & Signal Path Testing

Use SENDER and RECEIVER Modes for cable and signal path testing.

1) From the MAIN Screen, press the [Menu] key.
2) Press the [In] and [Out] keys to toggle between RS422 and RS232. Select either RS422 or RS232 to match the cable or signal path being tested.
3) Press the [Exit] key to exit the MENU Screen.
4) Press the [SEND] key to select SENDER mode.
5) Connect The Analyst RS422/RS232 Tester as follows.

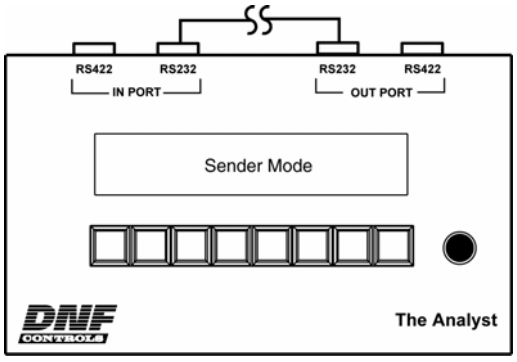
Using **TWO** Analysts:
(RS422 Shown)



Analyst Tester in operator's hands

Analyst Tester at far end of cable or signal path

Using **ONE** Analyst:
(RS232 Shown)

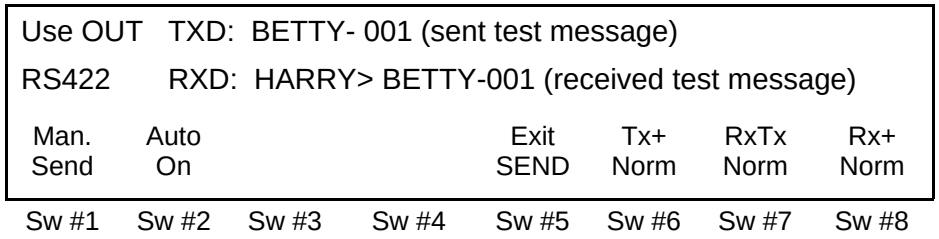


Analyst Tester in operator's hands

6) Connect the cable or signal path being tested to the OUT PORT. Connect the other end of the cable or signal path to the IN PORT.

When using only one Analyst, its IN PORT is automatically set to RECEIVER Mode.

SENDER Screen


Use OUT TXD: BETTY- 001 (sent test message)
RS422 RXD: HARRY> BETTY-001 (received test message)
Man. Send
Auto On
Exit SEND
Tx+ Norm
RxTx Norm
Rx+ Norm
Sw #1 Sw #2 Sw #3 Sw #4 Sw #5 Sw #6 Sw #7 Sw #8

[Man] Manual send. Press to send one test message

[Auto] Auto send. Press to automatically send test message every second.

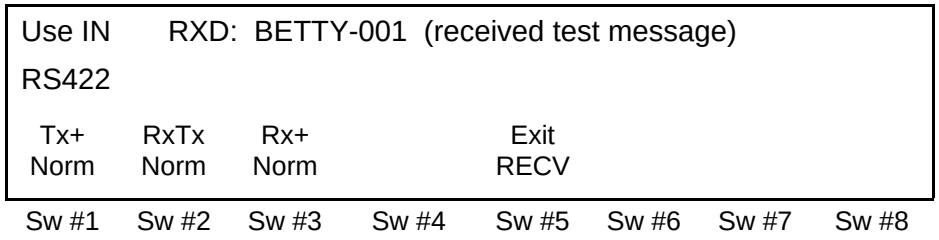
[Exit] Exit Sender Mode

[Tx+] Swap polarity of transmit lines (RS422 only)

[RxTx] Swap transmit and receive lines

[Rx+] Swap polarity of receive lines (RS422 only)

RECEIVER Screen



[Tx+] Swap polarity of transmit lines (RS422 only)

[RxTx] Swap transmit and receive lines

[Rx+] Swap polarity of receive lines (RS422 only)

[Exit] Exit Receiver Mode

7) On the SENDER Analyst, press the [AUTO] key to automatically send test messages once every second.

OR,

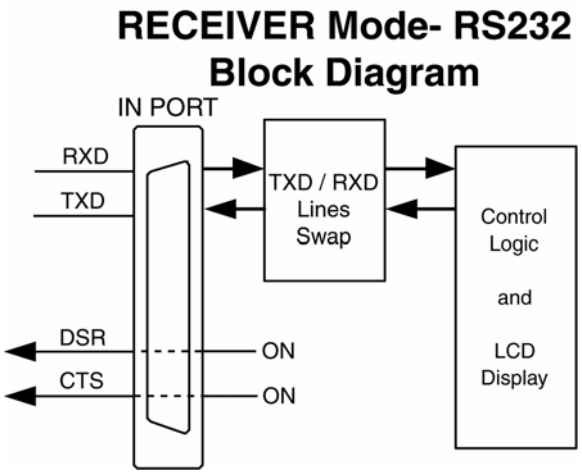
Press the [MAN] key to transmit a test message with every [MAN] key press.

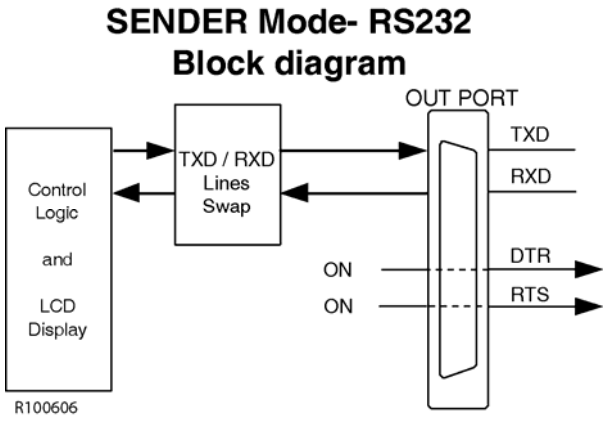
8) On the SENDER Analyst, view the received test message on the 2nd line of the display.

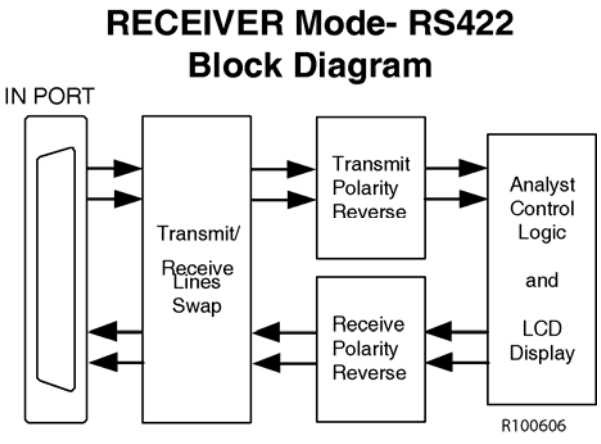
The received test message will show the ID of the RECEIVER Analyst followed by the SENDER's original test message.

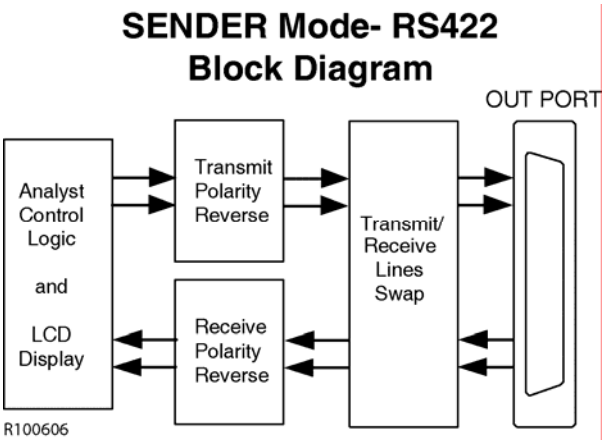
The received test message will match the sent test message when the transmit and receive signal paths or cable connections are correct.

No test message will be received or the test message will be unreadable if there is a connection problem.









SENDER/RECEIVER Mode Troubleshooting Tips

Received Test Message	What it means
Receive readable test message with Receiver's ID added.	Confirms that receive circuit from RECEIVER to SENDER is working. Also confirms that message received was same as message sent. Positive proof that both ends of the cable are connected to the same cable. Eliminates the possibility of crossed cables.
Receive ID from RECEIVER is readable but the original test message is unreadable.	The receive circuit is working. The transmit circuit may be reversed. Press the [Tx+] key to reverse the transmit lines (RS422). If the original test message is now readable, the transmit lines are reversed.
Receive unreadable test message.	The receive circuit may be working. Press the [Rx+] key on the SENDER to check for reversed receive lines (RS422). If received test message is now readable, the received lines are reversed. If the received test message contains the original test message, the transmit circuit is working.
No received test message.	The receive circuit is not working. Press the [RxTx] key on the SENDER to swap the transmit and receive circuits. If a test message is received, the transmit and receive lines are swapped.

F. Cable & Signal Path Testing- VTR Mode

Use VTR Mode to test cable and signal paths using a VTR.

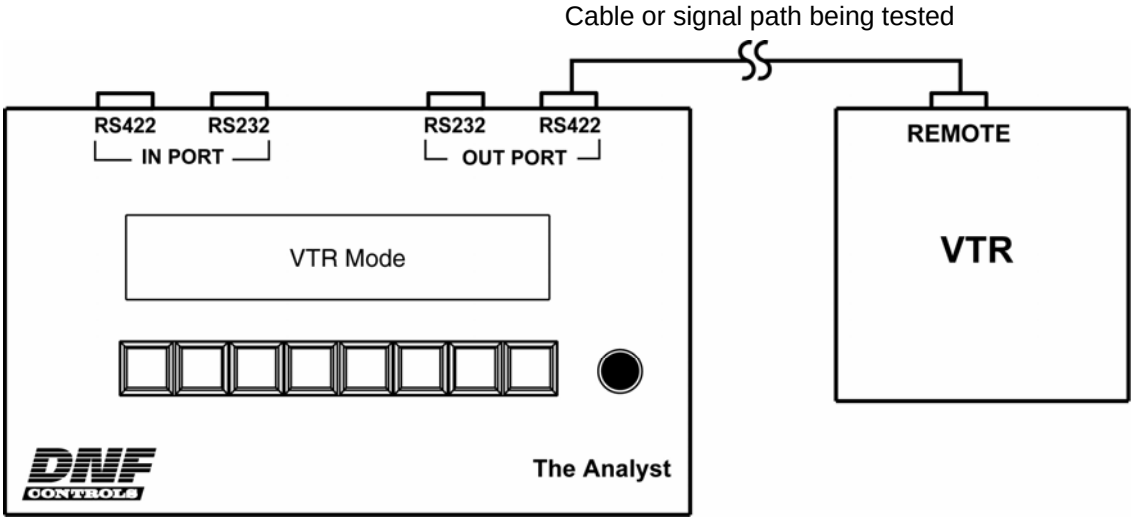
1) From the MAIN Screen, press the [Menu] key.

2) Press the [Out] key to toggle between RS422 and RS232. Select either RS422 or RS232 to match the cable or signal path being tested.

3) Press the [Exit] key to exit the MENU Screen.

4) Press the [VTR] key to select VTR mode.

5) Connect The Analyst RS422/RS232 Tester as follows.

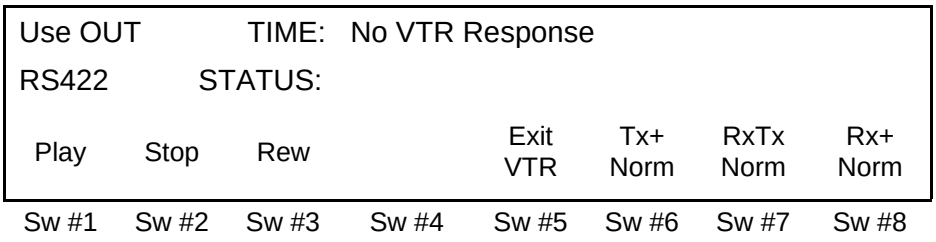


6) Connect the cable from the VTR to the OUT PORT on the Analyst

7) Press the [Play], [Stop], & [Rew] keys to control the VTR using SONY BVW commands.

The display shows current tape time and current transport status.

VTR Screen



[Play] Send Play command to VTR.

[Stop] Send Stop command to VTR.

[Rew] Send Rewind command to VTR.

[Exit] Exit Monitor Mode

[Tx+] Swap polarity of transmit lines (RS422 only)

[RxTx] Swap transmit and receive lines

[Rx+] Swap polarity of receive lines (RS422 only)

Refer to Sender/Receiver Mode for IN and OUT port block diagrams

VTR Mode Troubleshooting Tips

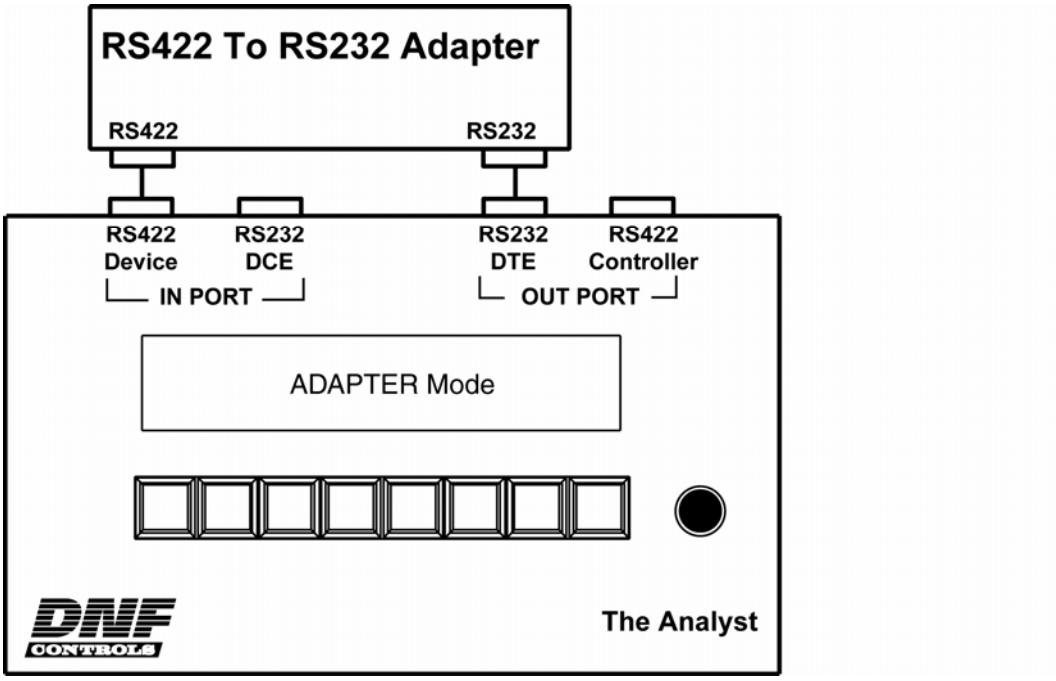
Problem	What it means
Not able to control VTR. The display shows “No VTR Response.”	The Transmit circuit is not working. Press the [RxTx] key to swap the transmit and receive lines. If display shows time and status, or you have control of the VTR, the receive and transmit lines are swapped. Press the [Tx+] key to swap the transmit lines (RS422). If you have control of the VTR, the transmit lines are reversed.
Able to control VTR, but the display shows “No VTR Response.”	The transmit circuit is working. The receive circuit may be reversed. Press the [Rx+] key to reverse the receive lines (RS422). If the display shows time and status, the receive lines are reversed.

G. RS422 To RS232 Adapter Testing

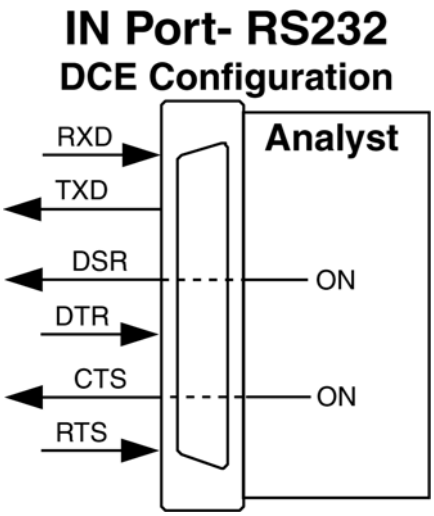
Use ADAPTER Mode to test RS422 to RS232 adapters (converters).

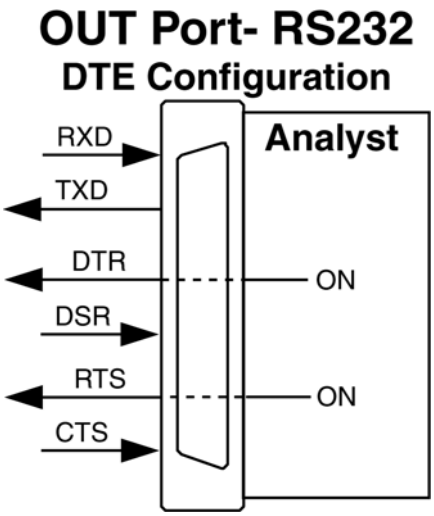
1) From the MAIN screen, press the [ADAPT] key to select ADAPTER mode.

2) Connect The Analyst RS422/RS232 Tester as follows.
(Shown- IN RS422, OUT RS232 configuration)



NOTE- The OUT RS232 port will provide 20ma of current to support port powered adapters.





ADAPTER Screen- IN RS422 & OUT RS232 (Default)

Direction → → Transmit IN Port, Receive OUT Port

RS422 IN →			TXD: BETTY- 001 (sent test message)				
RS232 ← OUT			RXD: BETTY-001 (received test message)				
Tx+ Norm	RxTx Norm		Port Togl	Exit ADAPT	Dir → →	RxTx Norm	
Sw #1	Sw #2	Sw #3	Sw #4	Sw #5	Sw #6	Sw #7	Sw #8

[Tx+] Swap polarity of transmit lines (RS422 only)

[RxTx] Swap transmit and receive lines

[Port Togl] Toggle between RS232 & RS422 port on IN port & OUT port

[Exit] Exit Monitor Mode

[Dir] Change direction of data communication
Transmit IN Port, Receive OUT Port
Transmit OUT Port, Receive IN Port

Direction ← ← Transmit OUT Port, Receive IN Port

RS232 OUT →			TXD: BETTY- 001 (sent test message)				
RS422 ← IN			RXD: BETTY-001 (received test message)				
Rx+ Norm	RxTx Norm		Port Togl	Exit ADAPT	Dir ← ←	RxTx Norm	
Sw #1	Sw #2	Sw #3	Sw #4	Sw #5	Sw #6	Sw #7	Sw #8

[Rx+] Swap polarity of receive lines (RS422 only)

[RxTx] Swap transmit and receive lines

[Port Togl] Toggle between RS232 & RS422 port on IN port & OUT port

[Exit] Exit Monitor Mode

[Dir] Change direction of data communication
Transmit IN Port, Receive OUT Port
Transmit OUT Port, Receive IN Port

ADAPTER Screen- IN RS232 & OUT RS422

Direction → → Transmit IN Port, Receive OUT Port

RS232 IN →			TXD: BETTY- 001 (sent test message)				
RS422 ← OUT			RXD: BETTY-001 (received test message)				
	RxTx Norm		Port Togl	Exit ADAPT	Dir → →	RxTx Norm	Rx+ Norm
Sw #1	Sw #2	Sw #3	Sw #4	Sw #5	Sw #6	Sw #7	Sw #8

[RxTx] Swap transmit and receive lines

[Port Togl] Toggle between RS232 & RS422 port on IN port & OUT port

[Exit] Exit Monitor Mode

[Dir] Change direction of data communication
Transmit IN Port, Receive OUT Port
Transmit OUT Port, Receive IN Port

[Rx+] Swap polarity of receive lines (RS422 only)

Direction ← ← Transmit OUT Port, Receive IN Port

RS422 OUT →			TXD: BETTY- 001 (sent test message)				
RS232 ← IN			RXD: BETTY-001 (received test message)				
	RxTx Norm		Port Togl	Exit ADAPT	Dir ← ←	RxTx Norm	Tx+ Norm
Sw #1	Sw #2	Sw #3	Sw #4	Sw #5	Sw #6	Sw #7	Sw #8

[RxTx] Swap transmit and receive lines

[Port Togl] Toggle between RS232 & RS422 port on IN port & OUT port

[Exit] Exit Monitor Mode

[Dir] Change direction of data communication
Transmit IN Port, Receive OUT Port
Transmit OUT Port, Receive IN Port

[Tx+] Swap polarity of transmit lines (RS422 only)

3) Press the [PORT TOGL] key to select the IN and OUT port connectors to use. One RS232 connector and one RS422 connector will always be selected.

Default configuration: IN RS422 Connector
OUT RS232 Connector

4) The top line of the display shows the test message sent by the IN PORT. The 2nd line of the display shows the test received by the OUT PORT.

The received test message will match the sent test message when the transmit circuit from the IN PORT and the receive circuit to the OUT PORT are correct.

No test message will be received or the test message will be unreadable if the transmit circuit or receive circuit have been wired incorrectly or the adapter is not operating properly.

5) Press the [DIR] key to now test the transmit circuit from the OUT PORT and the receive circuit to the IN PORT.

The received test message will match the sent test message when the transmit circuit from the IN PORT and the receive circuit to the OUT PORT are correct.

No test message will be received or the test message will be unreadable if the transmit circuit or receive circuit have been wired incorrectly or the adapter is not operating properly.

Refer to Sender/Receiver Mode for IN and OUT port block diagrams

ADAPTER Mode Troubleshooting Tips

Received Test Message	What it means
Receive readable test message. Using- IN RS422 connector OUT RS232 connector	Confirms that the selected transmit and receive circuit is working. The adapter' RS232 connector is configured as a DCE port. The adapter's RS422 connector is configured as a CONTROLLER port. Confirm that this is the desired port configuration. Press the [DIR] key to select the other transmit and receive circuit.
Receive readable test message. Using- IN RS232 connector OUT RS422 connector	Confirms that the selected transmit and receive circuit is working. The adapter' RS232 connector is configured as a DTE port. The adapter's RS422 connector is configured as a DEVICE port. Confirm that this is the desired port configuration. Press the [DIR] key to select the other transmit and receive circuit.
Receive unreadable test message.	**Transmitting IN RS422 connector-** Press the [Tx+] key to reverse the transmit lines. If the test message is now readable, the transmit lines are reversed. **Receiving OUT RS422 connector-** Press the [Rx+] key to reverse the receive lines. If the test message is now readable, these lines are reversed.

Received Test Message	What it means
Did not receive test message. Using- IN RS422 connector OUT RS232 connector	**Transmitting IN RS422 connector-** Press the [RxTx] key to swap the transmit & receive lines. If test message is now received, the adapter's RS422 port is configured as a DEVICE port. Confirm that this is the desired configuration. **Receiving OUT RS232 connector-** See note below regarding externally powered and port powered adapters. Press the [RxTx] key to swap the transmit & receive lines. If test message is now received, the adapter's RS232 port is configured as a DTE port. Confirm that this is the desired configuration --- **Transmitting OUT RS232 connector-** See note below regarding externally powered and port powered adapters. Press the [RxTx] key to swap the transmit & receive lines. If test message is now received, the adapter's RS232 port is configured as a DTE port. Confirm that this is the desired configuration. **Receiving IN RS422 connector-** Press the [RxTx] key to swap the transmit & receive lines. If test message is now received, the adapter's RS422 port is configured as a DEVICE port. Confirm that this is the desired configuration.

Received Test Message	What it means
Did not receive test message. Using- IN RS232 connector OUT RS422 connector	**Transmitting IN RS232 connector-** See note below regarding externally powered and port powered adapters. Press the IN PORT [RxTx] key to swap the transmit and receive lines. It test message is now received, the adapter's RS232 port is configured as a DCE port. Confirm that this is the desired configuration. **Receiving OUT RS422 connector-** Press the [RxTx] key to swap the transmit & receive lines. If test message is now received, the adapter's RS422 port is configured as a CONTROLLER port. Confirm that this is the desired configuration. --- **Transmitting OUT RS422 connector-** Press the [RxTx] key to swap the transmit & receive lines. If test message is now received, the adapter's RS422 port is configured as a CONTROLLER port. Confirm that this is the desired configuration. **Receiving IN RS232 connector-** See note below regarding externally powered and port powered adapters. Press the [RxTx] key to swap the transmit & receive lines. If test message is now received, the adapter's RS232 port is configured as a DCE port. Confirm that this is the desired configuration.

Externally Powered and Port Powered Adapters

PORT POWERED ADAPTER

Port powered adapters typically have their RS232 ports configured as DCE ports, so they will plug into the DTE port on a computer. Power is drawn from the RTS and DTR signal lines on the RS232 port. If the adapter's RS232 port is configured as a DTE port, it will not be able to draw power from the computer and will not operate.

The Analyst's OUT RS232 port is configured as a DTE port, like on the computer. The OUT port supplies power (up to 20ma. total) on the RTS and DTR lines to power the adapter. The IN RS232 port is configured as a DCE port. The IN port supplies power (up to 20ma. total) on the CTS and DSR lines to power the adapter.

If a port powered adapter is connected to an RS232 port with the incorrect configuration, it will not receive power from the port and will not operate.

Troubleshooting Tip

If the port powered adapter does not work when connected to the OUT RS232 port, move it to the IN RS232 port and repeat the test process.

If the port powered adapter does not work when connected to the IN RS232 port, move it to the OUT RS232 port and repeat the test process.

If the adapter does not work on the IN or OUT RS232 port, it may be faulty.

EXTERNALLY POWERED ADAPTER

Externally powered adapters use an external power supply to operate and do NOT require power from the RS232 port. The RTS and DTR signal lines are used only for hardware handshaking.

If an externally powered adapter is connected to an Analyst RS232 port with the incorrect configuration, press the appropriate [RxTx] key to swap the port transmit and receive lines. The adapter should begin to operate properly.

Troubleshooting Tip

If the externally powered adapter works in the RS422 transmit to RS232 receive direction but not in the other direction, change the RS232 ports between the IN port and OUT. It should now work in both directions. The reason is that some adapters use the RTS handshaking signal line to control the adapter's RS422 transmitter. If the adapter is connected to the wrong port configuration, the RTS line will not be driven properly, thereby turning off the RS422 transmitter.

H. Monitor Serial Communication Between Equipment

Use MONITOR Mode to monitor serial communication between two pieces of equipment.

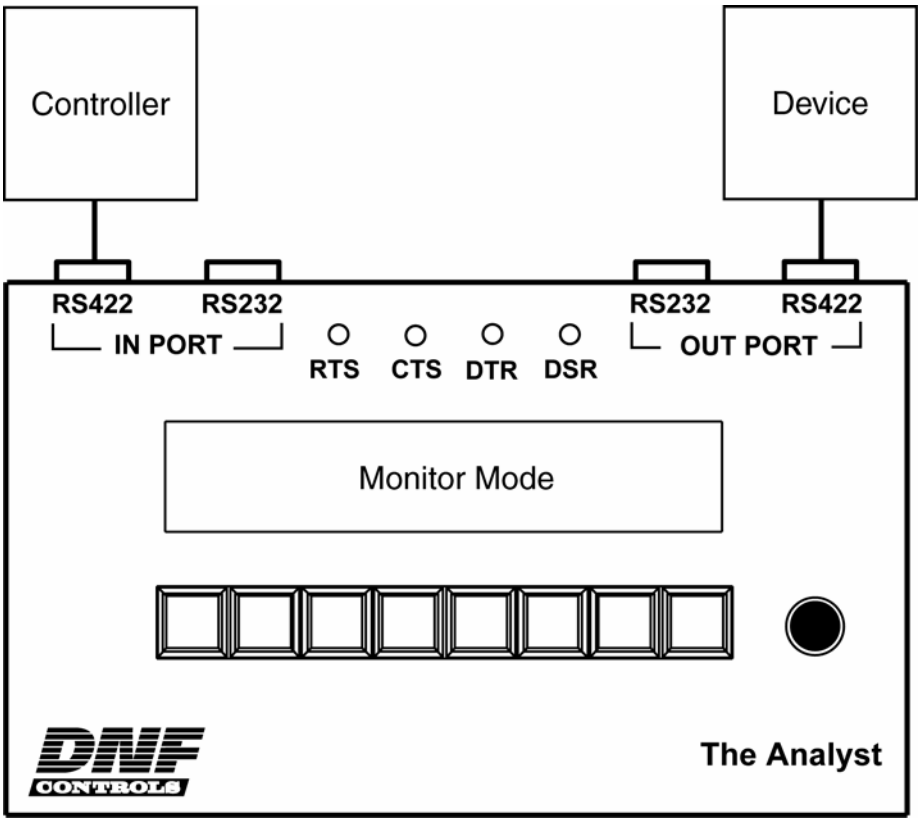
1) From the MAIN Screen, press the [MENU] key.

2) Press the [IN] and [OUT] keys to toggle between RS422 and RS232. Select either RS422 or RS232 to match the equipment being monitored.

3) Press the [Exit] key to exit the MENU Screen.

4) Press the [MON] key to select MONITOR Mode.

5) Connect The Analyst RS422/RS232 Tester between the two pieces of equipment. (Shown- IN RS422, OUT RS422)



MONITOR Screen- RS422

DIR ➔➔ Affect data communication path from IN port to OUT port

IN ➔ ➔➔ communication from Controller to Device							
RS422 ➔➔ communication from Device to Controller							
Rx+ Norm	RxTx Norm	Dir ➔➔	More	Exit MON.	Disp Run		Tx+ Norm
Sw #1	Sw #2	Sw #3	Sw #4	Sw #5	Sw #6	Sw #7	Sw #8

DIR ➔➔ Affect data communication path from OUT port to IN port

➔ OUT ➔➔ communication from Controller to Device							
RS422 ➔➔ communication from Device to Controller							
Tx+ Norm		Dir ➔➔	More	Exit MON.	Disp Run	RxTx Norm	Rx+ Norm
Sw #1	Sw #2	Sw #3	Sw #4	Sw #5	Sw #6	Sw #7	Sw #8

[RX+] Swap polarity of receive lines (RS422 only)

[RxTx] Swap transmit and receive lines

[Dir] Affect data communication path from IN port to OUT port (➔➔)
Or, affect data communication path from OUT port to IN port (➔➔)

[More] Select More screen

[Exit] Exit Monitor Mode. Return to MAIN screen.

[Disp] Display mode- Run: Update display with received data
Pause: Do not update display with received data

[Tx+] Swap polarity of transmit lines (RS422 only)

MONITOR Screen- RS232

DIR ➔➔ Affect data communication path from IN port to OUT port

IN ➔ ➔➔ communication from Controller to Device							
RS232 ➔➔ communication from Device to Controller							
RTS	RxTx	Dir		Exit	Disp		
Open	Norm	➔➔	More	MON.	Run		
Sw #1	Sw #2	Sw #3	Sw #4	Sw #5	Sw #6	Sw #7	Sw #8

DIR ➔➔ Affect data communication path from OUT port to IN port

➔ OUT ➔➔ communication from Controller to Device							
RS232 ➔➔ communication from Device to Controller							
RTS		Dir		Exit	Disp	RxTx	
Open		➔➔	More	MON.	Run	Norm	
Sw #1	Sw #2	Sw #3	Sw #4	Sw #5	Sw #6	Sw #7	Sw #8

[RTS] Connect IN port RTS to IN port CTS. Disconnect OUT CTS from IN CTS.
Connect IN port DTR to IN port DSR. Disconnect OUT DSR from IN DSR.

[RxTx] Swap transmit and receive lines

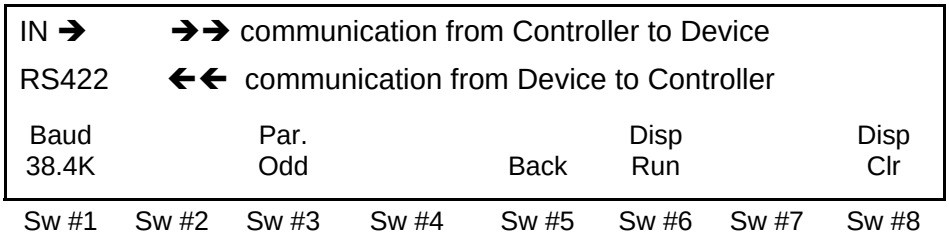
[Dir] Affect data communication path from IN port to OUT port (➔➔)
Or, affect data communication path from OUT port to IN port (➔➔)

[More] Select More screen

[Exit] Exit Monitor Mode

[Disp] Display mode- Run: Update display with received data
Pause: Do not update display with received data

MONITOR More Screen


IN ➔ ➔➔ communication from Controller to Device
RS422 ➔➔ communication from Device to Controller
Baud 38.4K
Par. Odd
Back
Disp Run
Disp Clr
Sw #1 Sw #2 Sw #3 Sw #4 Sw #5 Sw #6 Sw #7 Sw #8

[Baud] Select baud rate- 1200, 2400, 4800, 9600, 19.2K, 38.4K

[Par] Select parity- None, Odd, Even

[Back] Return to Monitor screen

[Disp] Display mode- Run: Update display with received data
Pause: Do not update display with received data

[Disp Clr] Clear displayed data communication

6) Press the [More] key. The MORE Screen will be displayed.

7) To change Baud rate and Parity, press the [Baud] and [Par.] keys, respectively. Press the [Baud] key to step through available baud rates. Press the [Par] key to step through available parities. The baud rate and parity settings simultaneously affect the IN and OUT ports.

Default Data Format-
Baud rate- 38,400
Parity- Odd
Data bits- always set to 8 bit
Stop bits- always set to 1 bit

8) Press the [Back] key to return the the MONITOR screen.

9) Press the [DIR] key to affect the data communication path from the IN port to the OUT port. The display will show "DIR ➔➔".

10) Press the [DIR] key again to affect the data communication path from the OUT port to the IN port. The display will show "DIR ➔➔".

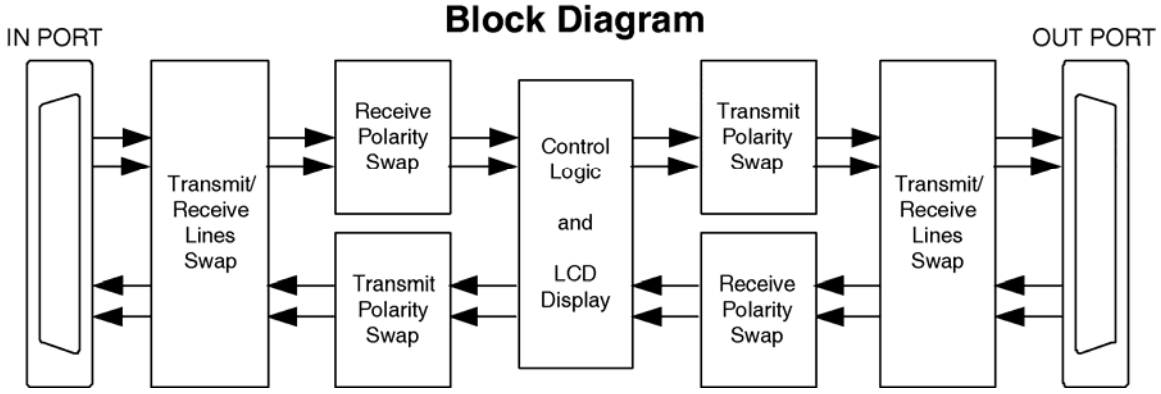
11) Communication from the Controller (IN port) to the Device (OUT port) will be displayed on the top line of the display.

Responses from the Device (OUT port) to the Controller (IN port) will be displayed on the 2nd line of the display.

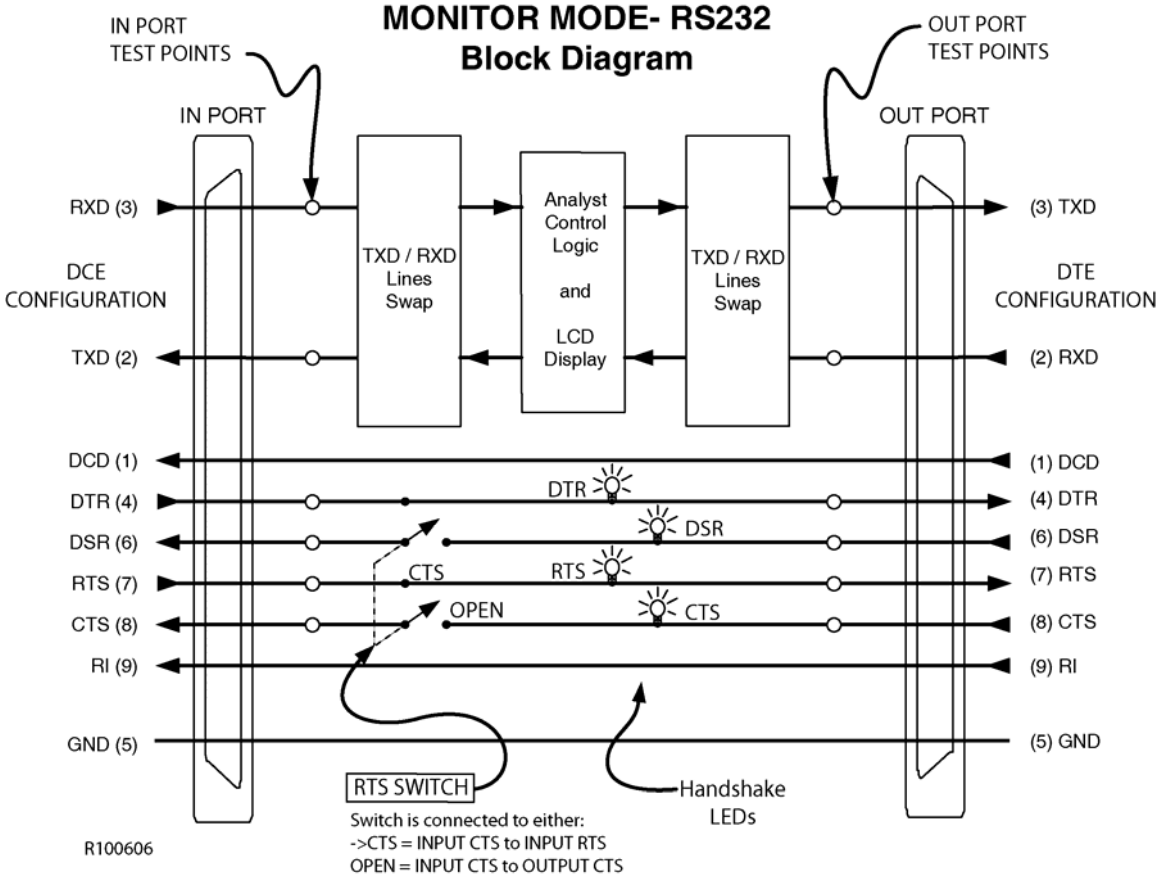
12) Press the [Disp Run] key to stop updating the display. Use the knob to scroll backwards and forwards through the displayed data.

Press the [Disp Paus] key to resume updating the display. The knob will have no effect on the display.

MONITOR MODE- RS422
Block Diagram



MONITOR MODE- RS232
Block Diagram



MONITOR Mode Troubleshooting Tips

Step#	On Analyst Display	What it means
1	The top line of the display, after ➔➔, is blank.	There is no communication from the Controller. Press the [DIR] key to select the DIR➔➔ screen. Press the [RxTx] key to swap the transmit and receive lines from the Controller. If characters are now displayed on the top line of the display, the transmit and receive lines are swapped. **IN Port RS232 Only-** The DTR indicator and RTS indicator on the front of the Analyst will turn on when the DTR and RTS signal lines are "ON". Press the [RTS] key to connect IN port RTS to CTS, and IN port DTR to DSR. Some controllers require a CTS and/or DSR handshake line to enable their transmitter.
2	The top line of the display, after ➔➔, shows unreadable characters.	The Controller is transmitting data to the Analyst, but the transmit circuit may be reversed. Press the [DIR] key to select the DIR➔➔ screen. Press the [Rx+] key to reverse the receive lines (RS422 only) at the Analyst. If readable data is now displayed on the top line of the display, the Controller transmit lines are reversed.

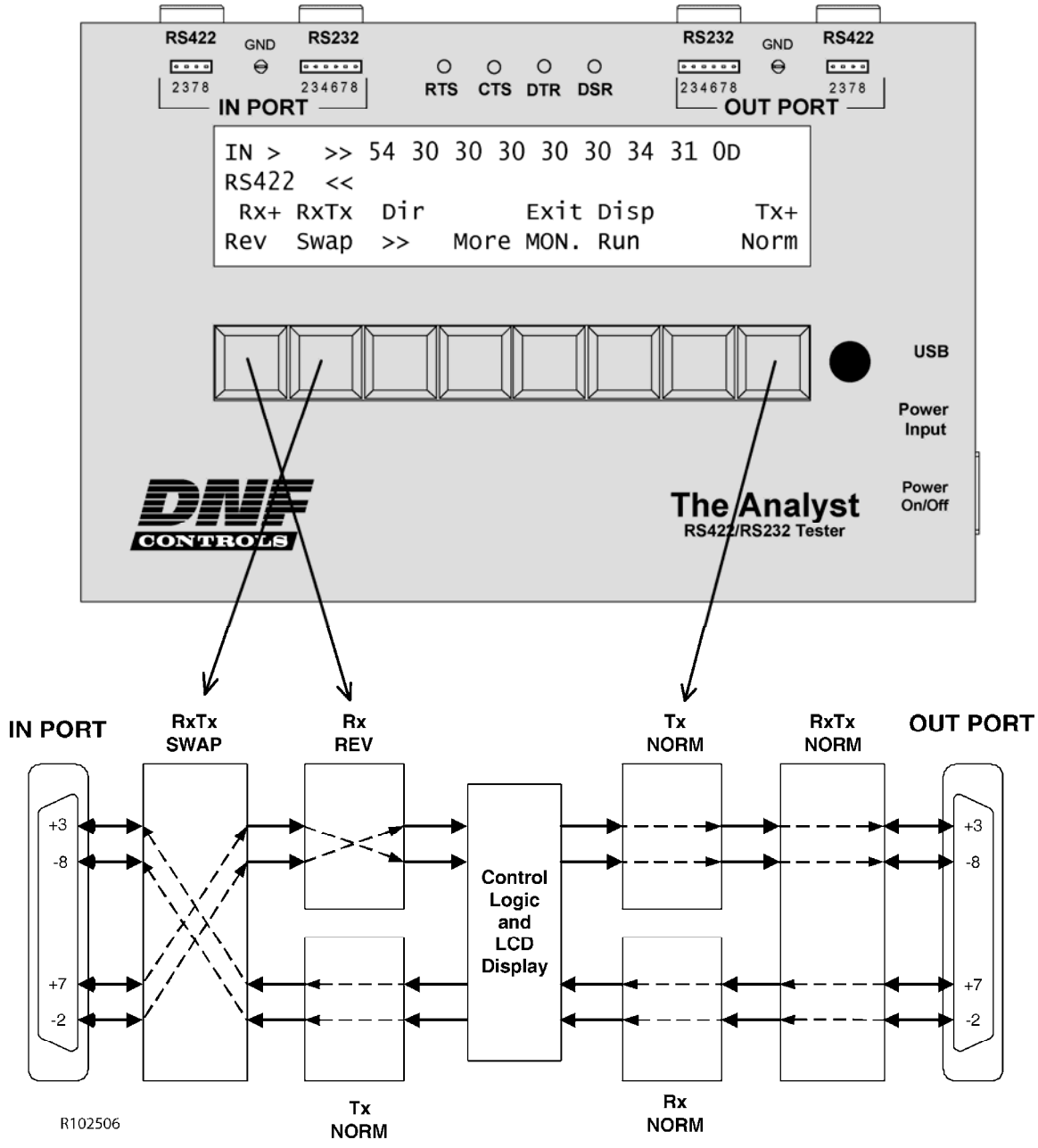
Step#	On Analyst Display	What it means
3	The top line of the display, after ➔➔, shows readable characters. The 2nd line of the display, after ←←, is blank.	The transmit circuit from the Controller to the Analyst is working. The transmit circuit from the Analyst to the Device may not be working. Press the [DIR] key to select the DIR←← screen. Press the [RxTx] key to swap the transmit and receive lines to the Device. If characters are now displayed on the 2nd line of the display, the transmit and receive lines are swapped. Press the [Tx+] key to reverse the transmit lines (RS422 only) to the Device. If readable data is now displayed on the 2nd line of the display, the transmit lines from the Analyst to the Device are reversed. **RS232 ONLY-** Some devices require a DTR or RTS signal from the controller to work. The DTR and RTS indicators on the front of the Analyst will turn on when the DTR and RTS signal lines from the Controller are "ON". When the DTR line is ON, some devices respond by turning on the DSR line. When the RTS line is ON, some devices respond by turning on the CTS line. The DSR and CTS indicators on the front of the Analyst will turn on when the DSR and CTS signal lines from the Device are "ON".
4	The top line of the display, after ➔➔, shows readable characters. The 2nd line of the display, after ←←, shows unreadable characters.	The transmit circuit from the Controller to the Analyst is working. The transmit circuit to the Device, from the Analyst, is working, but the transmit circuit may be reversed. Press the [DIR] key to select the DIR➔➔ screen. Press the [Tx+] key to reverse the transmit lines (RS422 only) to the Device (Device receive lines). If readable data is now displayed on the 2nd line of the display, the Device receive lines are reversed.

Step#	On Analyst Display	What it means
5	The top line of the display, after ➔➔, shows readable characters. The 2nd line of the display, after ←←, shows readable characters. The Controller can control the Device. The Controller is not receiving a response from the Device.	The transmit circuit from the Controller to the Analyst is working. The Device transmit and receive circuits are working. The receive circuit from the controller to the Analyst is not working. Press the [DIR] key to select the DIR←← screen. Press the [Tx+] key to reverse the transmit lines (RS422 only) to the Controller (Controller receive lines). If the Controller is now receiving responses from the Device, the Controller receive lines are reversed.

I. Reference

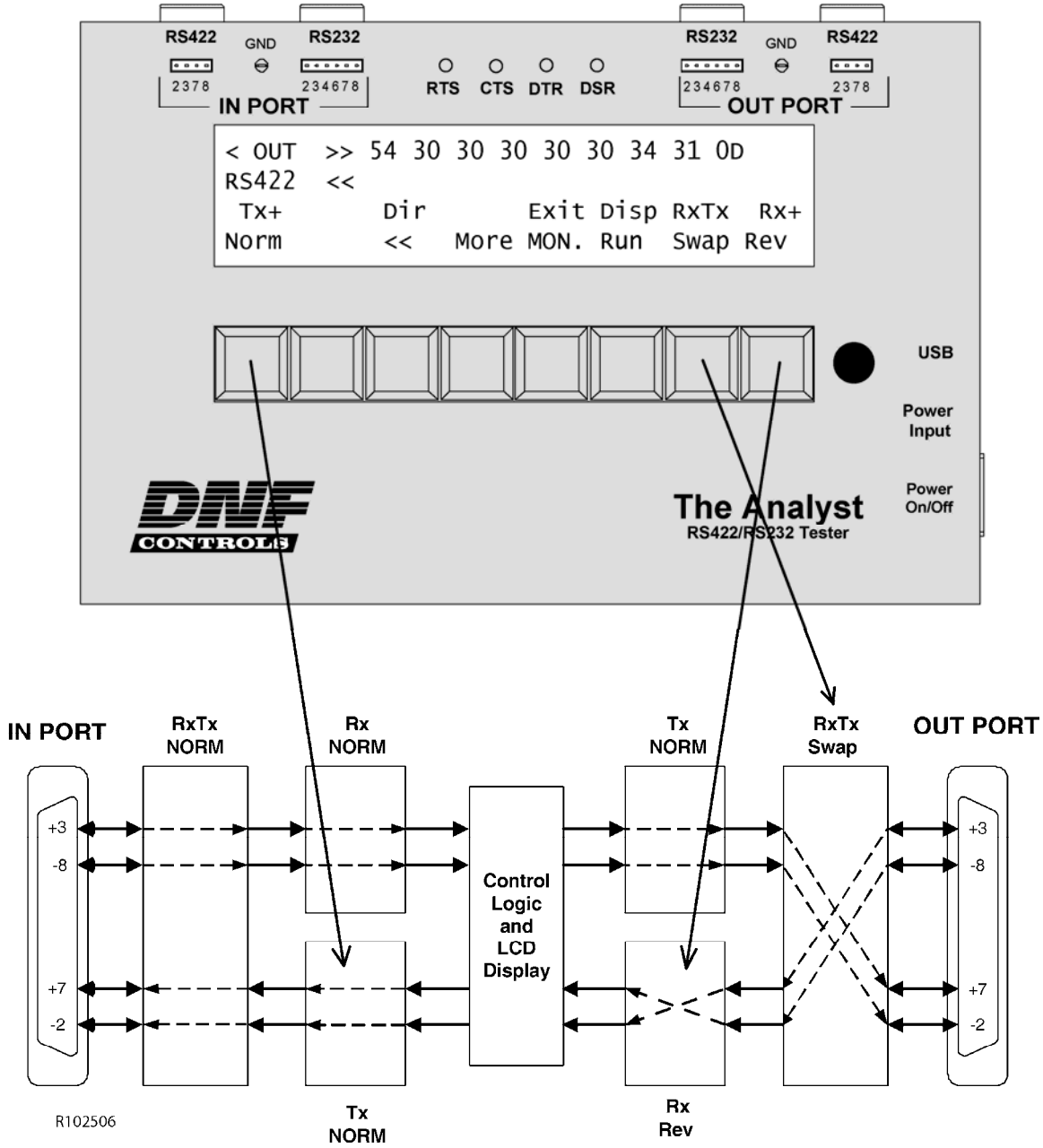
Button Relationship to Circuit

RS422 Input Port (Direction: Input port to Output port)



Button Relationship to Circuit

RS422 Output Port (Direction: Output port to Input port)



J. Specifications

Power: 5v DC @ 1amp
Power Connector: 2.1 mm power jack

Size: 9 inches (length) x 5.8 inches (width) x 1.9 inches (height)

Weight: 4 lbs.

Front panel display: Four-line x 40-character liquid crystal display

Front panel indicators: IN Port RS232 RTS
IN Port RS232 DTR
OUT Port RS232 CTS
OUT Port RS232 DSR

Front panel test points: IN Port RS232 pins 2, 3, 4, 6, 7, 8 Pin 5 connected to GND terminal
OUT Port RS232 pins 2, 3, 4, 6, 7, 8 Pin 5 connected to GND terminal

IN Port RS422 pins 2, 3, 7, 8 Pins 1, 4, 6, 9 connected to GND terminal
OUT Port RS422 pins 2, 3, 7, 8 Pins 1, 4, 6, 9 connected to GND terminal

Keyboard: Eight keys and a rotary knob

Connectors:		
	IN Port RS422	DB9 female
	IN Port RS232	DB9 female
	OUT Port RS422	DB9 female
	OUT Port RS232	DB9 female
	USB	Type B male

K. RS422/RS232 Connector Pin Outs

IN PORT, RS232 Connector
DCE configuration, 9 pin DB9F female connector

Pin #	Function	Signal Direction	Pin #	Function	Signal Direction
1	DCD	Out	6	DSR	Out
2	Txd	Out	7	RTS	In
3	Rxd	In	8	CTS	Out
4	DTR	In	9	RI	Out
5	Ground				

OUT PORT, RS232 Connector
DTE configuration, 9 pin DB9F female connector

Pin #	Function	Signal Direction	Pin #	Function	Signal Direction
1	DCD	In	6	DSR	In
2	Rxd	In	7	RTS	Out
3	Txd	Out	8	CTS	In
4	DTR	Out	9	RI	In
5	Ground				

IN PORT, RS422 Connector
Device configuration, 9 pin DB9 female connector

Pin #	Function	Signal Direction	Pin #	Function	Signal Direction
1	Frame Ground		6	Transmit Common	
2	Transmit A (-)	Out	7	Transmit B (+)	Out
3	Receive B (+)	In	8	Receive A (-)	In
4	Receive Common		9	Frame Ground	
5	Spare				

OUT PORT, RS422 Connector
Controller configuration, 9 pin DB9 female connector

Pin #	Function	Signal Direction	Pin #	Function	Signal Direction
1	Frame Ground		6	Transmit Common	
2	Receive A (-)	In	7	Receive B (+)	In
3	Transmit B (+)	Out	8	Transmit A (-)	Out
4	Receive Common		9	Frame Ground	
5	Spare				

L. DNF CONTROLS LIMITED WARRANTY

DNF Controls warrants its product to be free from defects in material and workmanship for a period of one (1) year from the date of sale to the original purchaser from DNF Controls.

In order to enforce the rights under this warranty, the customer must first contact DNF's Customer Support Department to afford the opportunity of identifying and fixing the problem without sending the unit in for repair. If DNF's Customer Support Department cannot fix the problem, the customer will be issued a Returned Merchandise Authorization number (RMA). The customer will then ship the defective product prepaid to DNF Controls with the RMA number clearly indicated on the customer's shipping document. The merchandise is to be shipped to:

DNF Controls
12843 Foothill Blvd., Suite D
Sylmar, CA 91342
USA

Failure to obtain a proper RMA number prior to returning the product may result in the return not being accepted, or in a charge for the required repair.

DNF Controls, at its option, will repair or replace the defective unit. DNF Controls will return the unit prepaid to the customer. The method of shipment is at the discretion of DNF Controls, principally UPS Ground for shipments within the United States of America. Shipments to international customers will be sent via air. Should a customer require the product to be returned in a more expeditious manner, the return shipment will be billed to their freight account.

This warranty will be considered null and void if accident, misuse, abuse, improper line voltage, fire, water, lightning or other acts of God damaged the product. All repair parts are to be supplied by DNF Controls, either directly or through its authorized dealer network. Similarly, any repair work not performed by either DNF Controls or its authorized dealer may void the warranty.

After the warranty period has expired, DNF Controls offers repair services at prices listed in the DNF Controls Price List. DNF Controls reserves the right to refuse repair of any unit outside the warranty period that is deemed non-repairable.

DNF Controls shall not be liable for direct, indirect, incidental, consequential or other types of damage resulting from the use of the product.

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